November 26, 2012

L-2012-402
10 CFR 50.73

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Re: St. Lucie Unit 1
Docket No. 50-335
Reportable Event: 2012-005-01
Date of Event: June 2, 2012

Unit 1 Reactor Trip on Turbine Trip

The attached supplement to Licensee Event Report 2012-005 is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Additionally, this Licensee Event Report was originally submitted per letter, L-2012-291, with an incorrect sequence number of 2012-007. The correct sequence number is 2012-005. This administrative error has been corrected and was discussed with NRR Project Manager, Tracy J. Orf, St. Lucie Plant Licensing Branch II-2.

Very truly yours,

Joseph Jensen
Site Vice President
St. Lucie Plant

JJ/rcs
Attachment

IE22
NRR

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(10-2010)

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
St. Lucie Unit 1	05000335	1 OF 3

4. TITLE
Unit 1 Reactor Trip on Turbine Trip

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									NA	
6	02	2012	2012	- 005 -	01	11	26	12	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE
1

10. POWER LEVEL
100%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Richard Sciscente - Principal Engineer, Licensing	772-467-7156

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURE	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURE	REPORTABLE TO EPIX
B	IT	CON	E232	YES	B	IT	DCC	E232	YES

14. SUPPLEMENTAL REPORT EXPECTED
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On June 2, 2012 at 1935 with St. Lucie Unit 1 in Mode 1 at 100% power the reactor automatically tripped from normal full power operation due to a loss of load following a failure of the turbine control system (TCS). The reactor trip was uncomplicated and all control rod assemblies (CEAs) fully inserted. No automatic safety system actuations were required and none occurred. The reactor coolant system (RCS) heat removal was maintained with main feedwater (MFW) and steam bypass to the condenser. The Offsite power grid was available and stable.

The reactor trip on turbine trip was caused by loss of communications of the Drop 3 and Drop 53 controllers in the recently installed Ovation turbine control system (TCS). The direct cause for the failure of the primary controller (Drop 53) was an intermittent fault in the Remote Node Controller (RNC) or the Media Attachment Unit (MAU). The back up controller (Drop 3) failed due to a failed fiber optic (FO) cable field connector. The root cause of this event was ineffective design control for the TCS upgrade.

Immediate corrective actions taken included removing all questionable control modules and controllers. Corrective actions to prevent reoccurrence included providing additional guidance to operators in the annunciator response procedure and implementing a new normal operating procedure for the TCS.

This event had no effect on the health and safety of the public.

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

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NARRATIVE

Description of the Event

On June 2, 2012 at 1935 St. Lucie Unit 1 reactor automatically tripped from normal full power operation due to a loss of load following a failure of the turbine control system (TCS) [CON:IT]. No automatic safety system actuations were required and none occurred. The reactor coolant system (RCS) heat removal was maintained with main feedwater (MFW) and steam bypass to the condenser.

Cause

The reactor trip on turbine trip was caused by loss of communications of the Drop 3 and Drop 53 controllers in the Ovation turbine control system (TCS). The direct cause for the failure of the primary controller (Drop 53) was an intermittent fault in the Remote Node Controller (RNC) or the Media Attachment Unit (MAU) [DCC:IT]. The back up controller (Drop 3) failed due to a failed fiber optic (FO) cable field connector [CON:IT]. The root cause of this event was ineffective design control for the TCS upgrade.

Analysis of the Event

The primary function of the recently installed TCS is to control the proper speed and load of the turbine. The TCS consists of five controller cabinets each containing redundant controllers identified as "Drops." Failed Drops 3 and 53 are redundant Drops in one of the five controller cabinets. Prior to the event, Unit 1 was in Mode 1 and stable at 100% reactor power with no evolutions in progress or abnormal plant indications. At 1453, Drop 53 failed and transferred to Drop 3. At 1935, Drop 3 failed with no back-up causing the turbine / reactor trip.

Contributing factors to the ineffective design control for the TCS upgrade included weakness in the troubleshooting procedure, alarm response procedure, training on the new plant modification, workmanship and post maintenance testing. As a result, the unit was started up with TCS hardware deficiencies and a limited capability for responding to system malfunctions.

This licensee event report is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A) as "an event or condition that resulted in manual or automatic actuation of the reactor protection system including reactor scram or reactor trip."

Safety Significance

A risk assessment associated with Unit 1 automatic reactor trip event due to failure of TCS was developed. The conditional core damage probability (CCDP) and conditional large early release probability (CLERP) values were evaluated for the stated event and were found to be significantly below the thresholds required by RG-1.174 for the risk to be "Small", where CCDP is below 1.0E-06 and CLERP is below 1.0E-07. Therefore, it is concluded that this event had no effect on the health and safety of the public.

Prompt Corrective Action

All questionable control modules and the controllers were replaced.

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NARRATIVE

Corrective Actions

The corrective actions below have been entered into the site corrective action program. Any changes to the actions will be managed under the corrective action program.

1. Additional guidance has been added to the annunciator response procedure for responding to TCS alarms.
2. A new normal operating procedure was developed and implemented for the TCS.
3. Additional TCS training is being provided to Operations, Engineering, and Maintenance.
4. New maintenance procedures were developed and implemented for the TCS.
5. The design control process is being revised to require risk based reviews for post maintenance test sequencing following risk significant plant modifications.

Similar Events

A search of the corrective action database for three years was performed and identified no issues that were related to the faults identified with this event.

Failed Component(s)

The primary controller (Drop 53) failed due to a fault in the Remote Node Controller or the Media Attachment Unit. The back up controller (Drop 3) failed due to a failed fiber optic cable field connector.

Manufacture: Model:

Emerson Electric Company

1C31203G01, Ovation RNC Electronics Module

1C31204G01, Ovation RNC Personality Module

1C31179G02, Ovation MAU Electronics Module

1C31181G02, Ovation MAU Personality Module